

ABSTRACT

A cardiac device system for implementing a cardiac device having adaptive treatment
5 therapies utilizing a neural network based learning engine includes an implantable cardiac device
module and an external data processing system for specifying the operating characteristics of the
cardiac device module. Both the cardiac device module and the external processing system possess
an artificial neural network to specify the operation of the cardiac device module as it provides
adaptive treatment therapies. The external data processing system includes a complete neural
10 network module that trains and validates the operation of the neural network to match the optimal
treatment options with a received set of collected patient data. In contrast, a runtime neural network
module that only provides real time operation of the neural network using collected patient data is
located within the cardiac device module. The cardiac device module and the external processing
module communicate with each other to pass collected patient data from the cardiac device module
15 to the external processing system when the operation of the neural network is to be updated. The
cardiac device module and the external processing module also communicate with each other to pass
operating coefficients for the neural network back from the external processing system to the cardiac
device module once these coefficients are updated.